

What Makes High Knob Special – Part II

***Wayne Browning**

To celebrate the 12th Annual High Knob Naturalist Rally, and the 20th Anniversary of The Clinch Coalition, a series of articles throughout the month of September will describe and highlight the natural environment and biological diversity of the wondrous High Knob Massif.

Intensely blue skies of an unusually crisp, quiet autumn afternoon are broken by the croaking calls of a Northern Raven as it flies above the highest terrain of the Cumberland Mountains. Down below a diverse tapestry of color decorates a lofty, U-shaped valley snuggled amid 4,000 foot peaks, where headwater springs of Big Stony Creek emerge to feed a vast diversity of life surrounding and within an iridescent mountain wetland and lake. Water flowing forth from this majestic basin plunges more than 2200 vertical feet in 13 miles, through deep mountain gorges, to feed life-sustaining nutrients into one of the most biologically diverse rivers on the North American continent.

Nearby, as the Raven flies, a wilderness valley lies beneath rugged cliffs and rock-capped ridges. A Bear raises up through a mass of ferns and frost-bitten wildflowers to watch a family of Beavers busily working on their latest dam which allows pristine water to spread across acres of sphagnum covered wetlands. Canada Mayflower, Mountain Anemone, Tawny Cottongrass, Spirea, Whorled Loosestrife, and a vast array of other herbaceous species grow beneath Yellow Birch, Black Cherry, Striped Maple, American Beech and Canadian Hemlock in an environment climatically more akin to the Great Lakes or New England than southern Virginia. From far beneath its soil to the very tree tops life is here abundant, complex, and interconnected in wondrous ways only partially understood.

At the same moment in time, far beneath the Bear's feet, a vast three-dimensional network of vertical and horizontal passages contain life forms which are bizarre and other-worldly. Life sustaining waters fall vertically down shafts, drip from ceilings, and form pools within a subterranean wilderness which is ruled by gradients of pressure driven air through a world devoid of light.

Words above describe the Big Cherry Lake and High Knob Lake basins, held up by the high country of the High Knob Massif as islands in the sky. Although all words are based on accurate observations they can not begin to translate the true significance of these places.

An array of forces have conspired to create this extraordinary landscape which due to a lack of spruce and fir capping its highest summits, at this moment in time, is more often than not neglected by many who speak out for the preservation of Appalachian wild places. At least, up until this new century.

The book *Precious Heritage – The Status of Biodiversity in the United States* brought national and worldwide attention with its publication in the year 2000. Based upon natural heritage data submitted by all states across the nation, *Precious Heritage* placed the bullseye for the "rarity and richness of limited range species" directly over the Clinch and Powell river basins of far southwestern Virginia. Only a location in California was close within the continental USA. This included terrestrial, aquatic, and subterranean species.

Many more species of significance have been locally discovered since 2000 and, no doubt, many more await discovery. So what has made this area centered upon the High Knob Massif and its extended landform a hotspot for limited range species and biodiversity?

This is a landscape which was never glaciated during the Pleistocene (although snow fields may have been nearly permanent at upper elevations in places like High Knob Lake), a landscape which has been dominated by wetness driven erosional processes through a vast amount of time that acted to open up the core of the incredible Anticline described during the first part of this series.

The Powell Valley Anticline, the structural framework supporting this landform, is according to Wil Orndorff, of the Virginia Department of Conservation and Recreation's Karst Program, the only geological structure in Virginia (and known in the Appalachians) to host caves in all the cave bearing rock layers from Cambrian through Mississippian age. This is important since there are significant interactions between the surface and subterranean realms of the High Knob Massif and its extended landform, an aspect notably lacking in many other major mountains along the Appalachian chain.

The vertical life range zone of the High Knob Massif is greatly extended and enhanced by having the deepest cave system east of the Mississippi River, and north of Mexico in North America, below its surface. Species richness, in general, is further enhanced by the mixture of calcareous and clastic rock layers outcropping throughout the massif and its landform.

A study of low-level air flow trajectories during the past 70 years reveals another key reason, with mean annual flow streaming into the High Knob Massif area via the open expanse of the Tennessee Valley from the Gulf of Mexico. On such a flow air can reach the High Knob Massif without having to first cross any higher mountains downstream, a situation which changes radically for locations to the east in Virginia where long-term mean annual flow has to first cross many high mountains from northern Georgia across far eastern Tennessee and western North Carolina prior to reaching places such as Burkes Garden, Mountain Lake, and Mount Rogers. This is most applicable to the orographic forcing season, from November-April, when large-scale storm systems generate winds that physically push against the mountains (the convective season may be different, when hit-miss thunderstorms and landfalling tropical systems may strike randomly during the warmer portion of any given year).

This type of long-term mean annual flow has favored an abundance of mesic species, with the forest ecosystem of the Cumberland Mountains being long-described by ecologists, like Lucy Braun, as mesophytic with a rich diversity of species. *A Historic Architectural Survey of Wise County and the City of Norton* echoes this with a description of what early pioneers discovered:

"Travelers' accounts of the time commonly noted large stands of Walnut, chestnut, hickory, oak, poplar, pine, and hemlock trees that reached 4 to 8 feet in diameter and 150 feet in height. Secretary of Agriculture James Wilson, writing to President William McKinley in 1901, said: "These are the heaviest and most beautiful hardwood forests of the continent. In them species from east and west, north and south, mingle in a growth of unparalleled richness and variety.""

In that statement arises another important factor. The geographic location of the High Knob area, in combination with this non-glaciated landscape, has allowed species with southern, northern, midwestern, and far eastern affinities to become components of the flora and fauna.

Biological diversity tends to increase with increasing mean temperature into the tropics, such that the High Knob Massif, in particular, is too cold to be the hotspot for total biodiversity in the continental USA. With that noted, its diversity is truly extraordinary for this latitude and enhanced by its geology, terrain, and long-term climatic wetness.

In part three of this series the focus will become even more concentrated on the high country of the High Knob Massif, and why these zones, and the cold air drainages they feed, are a high conservation priority. The aspect of biodiversity and why it even matters will also be discussed.

Meanwhile, plan to attend the 12th Annual High Knob Naturalist Rally to be held September 29 within majestic High Knob Lake Recreation Area. A family friendly event that welcomes everyone with open hands and a warm heart to celebrate our magnificent natural heritage.

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